Maternal immunization against clinical and sub-clinical necrotic enteritis in broiler chickens

C. F. CROUCH¹,  L.GOBBI²*,  G.S.K. WITHANAGE¹,  M.J. FRANCIS⁴

¹ Schering-Plough Animal Health Ltd, Harefield, Uxbridge, Middlesex, UB9 6LS United Kingdom; ² Schering-Plough Animal Health SpA, 20090 Segréate (Milan), Italy
*Corresponding author: luciano.gobbi@spcorp.com

One experimental vaccine containing *Cl. perfringens* alpha toxoid was tested under field conditions. Serum samples have been obtained from either breeder hens and their progeny; moreover, eggs were also collected to investigate the relationship between specific antibody titre in the yolk and that found in the hen serum.

The vaccine was well tolerated with no adverse reaction reported, other than some swelling at the injection site. There was no detectable effect on reproductive performance of breeder hens. The level of Necrotic Enteritis within the three flocks of broiler chickens followed to slaughter was insufficient for any significant effect due to vaccination to be measured. Nevertheless, the data did however suggest some evidence for improved performance in the progeny of vaccinated breeder hens.

**Keywords:** *Clostridium perfringens*, vaccination, necrotic enteritis, passive protection

**Introduction**

*Cl. perfringens* type A is, in low numbers, a normal inhabitant of the chicken intestine. Under certain circumstances the bacteria proliferate, secreting toxins (in particular alpha toxin) that produce areas of necrosis on the epithelial surface (Necrotic Enteritis, NE). Overt clinical disease is associated with high mortality (Ficken & Wages, 1997; Kaldhusdal & Lovland, 2000; van der Sluis, 2000), whilst milder (sub-clinical) disease results in depressed flock growth rates (Lovland & Kaldhusdal, 2001; Van Immerseel et al., 2004). Antibiotic feed additives have been used to control the disease for many years, however restrictions and even bans on the routine use of such compounds in poultry feed currently exist in some countries and are likely to be extended in the future. Since NE is common amongst broiler chickens it is therefore essential to investigate alternative methods of control (Connolly, 2001; Lovland et al., 2004).

**Materials and methods**

An experimental oil emulsion vaccine containing *Clostridium perfringens* alpha toxoid, was evaluated under field conditions in Italy. The vaccine was used to immunise approximately 12,000 hens and a similar number were kept as controls. All birds were observed for adverse reactions and egg production and viability. In addition, broiler chickens hatched from eggs collected at weeks 25, 40 and 58 were followed to slaughter and assessed for signs of clinical necrotic enteritis and overall growth performance (weight gain and FCR). Samples of serum for the quantification of antibody specific for alpha toxin were collected from breeder hens throughout the laying cycle and from broiler chickens during the first four weeks after hatching. Eggs were also collected at intervals in order to investigate the relationship between the specific hen antibody titre and that found in egg yolk. Serum samples obtained from broiler chicks during the first four weeks after hatching were used to assess passive transfer of antibody.
Results and discussion

The vaccine was well tolerated with no adverse reactions reported, other than some swelling at the injection site. There was no detectable effect on the reproductive performance of the breeder hens. Analysis of serum and egg samples from vaccinated birds demonstrated an active immune response to alpha toxin. The level of necrotic enteritis per se within the three flocks of broiler chickens followed to slaughter was insufficient for any significant effect due to vaccination to be measured. Nevertheless, the data did suggest some evidence for improved performance in vaccinated birds in terms of either production values or specific disease incidence. Further work is required to confirm the utility of maternal immunization against clinical and sub-clinical NE.

References